# *Policy & Procedure (P& P)*

| Policy Title : | | |
|---|---|---|
| **Packed Red Cell Preparation** | | |
| **Department** | **Index No.** | **Scope** |
| **Laboratory & Blood Bank** | **LAB-166** | **All Blood Bank staff** |
| **Issue Date** | **Revision NO** | **Effective Date** |
| **1432/06/10** | **3** | **1441/7/19** |
| **Review Due Date** | **Related Standard NO.** | **Page Number#** |
| **1443/7/19** | **CBAHI ( LB. 42 )** | **6** |

## 01. Policy:

01.1. Donor whole blood is collected in double, triple, or guardable bags with integral tubing within 10-15 minutes

01.2. Red blood cells are prepared from freshly collected whole blood by removal of 200 -250 ml of plasma at first 6-8 hours after collecting.

01.3. They are stored at 1-6°C with different anticoagulants resulting to different hematocrit values.

01.4. Red Blood cells stored in additive solution (AS) have hematocrit of 52-60% and a shelf life of 42 days, whereas RBCs stored in CPDA-1 have hematocrit of 70-80% and can be stored for 35 days. RBCs stored in CPD have same hematocrit as those stored in CPDA-1 but with shelf life of 21 days.

## 02. Definition :

This policy has a linked policy REVEOs LB 58 + RBC QC LB63

## 03. Purpose :

Separation of single donor's blood unite to its component to benefit more than one patient and to decrease the exposure to the unwanted antigen or antibodies with its subsequent side effect.

## 04. Procedure :

04.1. Packed red cells are prepared from 450 ± 45cc of whole blood drawn into a closed system containing 63ml of CPD with SAGM. Or by using CPD-A1 bag, Red blood cells are obtained by removal of supernatant

plasma from centrifuged whole blood. The volume of plasma removed determines the hematocrit of the component.

04.2. Additive red cell preservative of 100ml volume additive solution" SAGM is added to PRBC after removal of plasma.

04.3. The final hematocrit after addition of additive solution" SAGM or ADSOL" is about 65%, a level that facilitates excellent flow rates and allow easy administration.

04.4. If only 300 to 400ml of whole blood is collected, packed red blood cells can be separated provided the unit is labeled "Red Blood Cells Low volume. However other components should not be prepared from these low volume units.

04.5. If less than 300ml whole blood is collected, the unit should not be used for transfusion as the ratio of blood to anticoagulant is not correct.

04.5.1. **Materials:**

- 04.5.1.1. Refrigerated centrifuge
- 04.5.1.2. Freshly collected whole blood
- 04.5.1.3. Plastic clips
- 04.5.1.4. Dielectric sealer
- 04.5.1.5. Plasma extractor
- 04.5.1.6. Balance and small weights
- 04.5.1.7. Degree C refrigerator

04.5.2. **Preparation Method**

- 04.5.2.1. Centrifuge the whole blood at light spin 2600 rpm for 7 minutes with a temperature setting of $22^0$C. The time includes the acceleration and time at speed but not the deceleration.
- 04.5.2.2. Place the primary bag containing the centrifuged blood on the plasma extractor. Release the spring. Allow the plate of the extractor to contact the bag.
- 04.5.2.3. Clamp the tubing between the primary and satellite bags with a temporary clip.
- 04.5.2.4. Pinch open the closure of the primary bag, release the clip and allow plasma to flow into the satellite bag.

04.5.2.5. Remove appropriate amount of plasma reapply the clip when the desired amount of the supernatant plasma has entered the satellite bag. Seal the tubing between the two bags in at least two places. Use a dielectric sealer.

04.5.2.6. Label the primary bag as packed cells and check that satellite bag has the same donor number and cut the tubing between the two seals.

04.5.2.7. Make sure that the following information is written on each bag after component preparation: donor's number, production date, expiration date, name of product.

04.5.2.8. After the plasma is removed, the additive solution SAGM is allowed to flow from the attached satellite bag into the red cells. This will result in a hematocrit of approximately 65%.

**PREPARATION OF LEUKOREDUCED RED BLOOD CELLS: LR-RBCs**

- Suspend storage bag containing SAGM at a height of 1.2-1.5 m above the transfert bag , ensuring that red cell filter hangs in a vertical position. Open breakway closure and clamp on storage bag to allow additive solution to flow through red cell filter to red cells in collection bag. Clamp tubing close to collection bag and mix thoroughly.
- Suspend collection bag at a height of 1.2-1.5 m above the storage bag , then remove clamp to allow red cells to flow by gravity through filter and into storage bag.
- Note: during filtration do not apply pressure to increase flow rate.
- Immediately after filtration, seal numbered tubing close to filter. Remove filter and collection bag and discard them in the biohazard waste.

04.5.2.9. Preserve the bag in unscreened refrigerator at 1-6 °C.

04.5.2.10. After appearance of serology result screen all RBCs bags and put the free units in the fresh blood refrigerator.

04.5.2.11. After 7 days, transfer these bags to the other refrigerator.

04.6. After the release of serology and NAT results, make the triage of the bags and discard the positive units then put the special label on the unit.

04.7. After double checking for serology and blood grouping results transfert the screened units to the screened RBCs refrigerator .

04.8. After 7 days transfer these bags to the other refrigerator

**4.5.3. Storage**

**RBCs components are stored under properly controlled conditions between 1 and 6 C**

**4.6. Expiration**

| Component | Expiry time |
|---|---|
| **Packed RBCs** | |
| **ADSOL OR SAG** | **42 days** |
| **CPDA-1** | **35 days** |
| **CPD or ACD** | **21 days** |

**4.7. Transportation**

**RBCs components are transported in properly insulated container between 1 C and 10 C**

**4.8. Quality control:**

**4.8.1. The hematocrite level**

1% of the monthly production but not less than 4 units of Packed red blood cells are subjected to quality control testing every month.

**Steps:**

- Mix units by horizontal platelet rotator for 30-60 min.
- Calculate volume of RBCs by dividing weight / 1.06 (sp.gr of blood)
- Label a 5 mlred top tube with unit number for each RBC unit
- Draw 5 ml of RBCs by syringe and empty content in the corresponding red top labeled tube.
- Send sample for HCT ratio in hematology section.
- Enter HCT results in RBCs QC form
- Discard units in Biohazard bags for disposal.

**Accepted results:**

All tested RBC units have a hematocrite level less than 80 % .

If PRBCs are with additive solution the accepted value for the hematocrite is 46-65 %.

4.8.2. **Quality control of leukoreduced red blood cells: LR-RBCs**

1% of the quarterly production of the leukoreduced RBC but not less than 12 units every 3 months are subjected to quality control testing .

All tested LR-RBCs units have a RBC recovery rate of more than 85% and a residual WBC count of less than 5 * 10 exp 6 WBC/unit in all subjected units.

If results were not accepted , corrective action should be implemented.

## 05. Responsibilities :

All laboratory & Blood Bank staff of Al-Qunfudah General Hospital.

## 06. Equipment & Forms

RBC Quality control form

RBC transportation record.

## 07. Attachment :

Link to LAB-060 Blood components preparation using REVEOS automated blood processing System

**Attachment 2** MEMO FROM MOH FOR VOLUME COMPONENT PREPARATION

| VOLUME | WEIGHT (Gms) | REMARKS |
|---|---|---|
| QNS | less than 413 gm(318 gmblood+95gm bags weight) | discard |
| Low volume | 413:523gm(318:428 gm blood +95 gm bags weight) | PRBCs only |
| Ideal volume | 524:620 gm(429:525 gm blood + 95 gm bags weight) | Separate to its component |
| Heavy unit | more than620 gm(525 gm blood + 95 gm bags weight) | discard |

## 08. Reference

08.1. The Technical manual of the American Association of Blood Banks 18TH edition , 2016

08.2. Memo from MOH about the donated blood volume.

08.3. The unified Practical Procedure Manual for Blood Banks in The Arab Countries 2013

## Preparation , Reviewing & Approval Box

| | NAME | POSITION | SIGN & STAMP | DATE |
|---|---|---|---|---|
| Prepared By | Dr RAJA NACER SASSI | Head of Blood Bank | | 14/7/1441 |
| Reviewed By | Dr IBRAHIM AWADH | Lab &B.Bank HOD | | 14/7/1441 |
| Document Reviewed By | Dr FAISAL FALATA | TQM Director | | 14/7/1441 |
| Reviewed By | Dr AHMAD BALBAID | Medical Director | | 14/7/1441 |
| Approved By | Mr HASSAN ALNASHERI | Hospital Director | | 11/3/2020 |

Stamp Here

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